

Chapter 1

POLICIES ADDRESSING CHEMICAL DISCHARGES FROM LABORATORIES AT  
THE UNIVERSITY OF CALIFORNIA, BERKELEY

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This section of the paper will survey (1) the agencies or departments that are concerned with chemical discharges from laboratories on the UCB campus and (2) the laws that address these discharges and their impacts on water quality.

The safe handling and disposal of chemical substances in a UCB lab is ultimately the responsibility of the user. There can be little doubt that certain chemicals can cause harm to man and the environment. In order to minimize this risk, several parties are involved to insure that certain precautions are taken.

While hazardous chemicals are still in the lab, they are the concern of the individual departments and UCB's Office of Environmental Health and Safety (EH&S). Once in the drain, they become part of the effluent. While these discharges are in the campus sewer system, they are under the jurisdiction of UCB's Department of Facilities Management (DOFM). Once the effluent passes from campus through the City of Berkeley it falls under the jurisdiction of the East Bay Municipal Utility District (EBMUD). The effluent is then processed through a wastewater treatment plant, EBMUD's Special District No. 1 (SD1). Finally it is discharged at a point source into San Francisco Bay. Here, the effluent is monitored by EBMUD and regulated by the state under federal law.

Federal Water Pollution Control Act

Water quality has long been recognized as a national problem. On the federal level it was addressed by the Federal Water Pollution Control Act (FWPCA) of 1972. The purpose of the Act was "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (ABAG, 1978, p. III-10). The Act has had a tremendous impact on improving water quality by providing funds for sewage treatment plants. Another important provision of the Act was the establishment of the National Pollutant Discharge Elimination System (NPDES). Under this system, the federal government sets effluent standards and incorporates these into permits for individual discharges.

Unlike most federal environmental laws, the FWPCA is not implemented by the Environmental Protection Agency (EPA). In the majority of cases, EPA has delegated the regulatory powers of the NPDES to the states. In California, the NPDES is administered by the State Water Resources Control

Board through its nine Regional Water Quality Control Boards. The San Francisco Regional Water Quality Control Board, Region 2 (RWQCB), has issued about 180 permits for discharges into the Bay (Richie, pers. comm.). These permits are all similar in format and list the type of discharger, characteristics of effluent, receiving water limitations, provisions for compliance, and effluent limitations for a variety of chemical substances, as well as biological oxygen demand, suspended solids, and pH. The chemical substances include several heavy metals, total identifiable chlorinated hydrocarbons (TICH), and phenolic compounds (see Appendix A). The effluent limitations, which are based on FWPCA guidelines, take into account the discharger's present treatment facilities and, thus, may vary from permit to permit. The RWQCB must also monitor the effluent from dischargers. This is done primarily through a self-monitoring program in which dischargers test effluent and present results monthly to the RWQCB.

#### East Bay Municipal Utility District

Special District No. 1 - One permit issued by the RWQCB is to EBMUD for the effluent discharged at its wastewater treatment and disposal facility (RWQCB, 1979). This secondary treatment facility, known as Special District No. 1 (SD1), serves seven cities, including Berkeley (and the UCB campus) (EBMUD, 1980). In the past, EBMUD has easily met its effluent limitations described in its permit from the state.

SD1 was designed primarily to remove suspended solids by sedimentation and biological contaminants through chlorination. Many chemical substances coming from industry and labs, though not intentionally removed in the process, are eliminated during this treatment process. For instance, some of the metals are absorbed by bacteria or become attached to particles that settle out. Other substances, such as the chlorinated hydrocarbons, are altered chemically when chlorine or oxygen is added, reducing their potency as a pollutant. While in most cases chemicals are removed through SD1 treatment, there is a high degree of month-to-month variability. In fact, there are times when effluent concentrations of certain chemicals are equal to or greater than influent concentrations (EBMUD, 1982). EBMUD does not rely on incidental removal of chemicals during the SD1 treatment process. Instead, the primary way EBMUD keeps SD1 effluent within the limits described in its permit from the RWQCB is by regulating the sources of effluent.

Ordinance 270 - As a municipal utility, EBMUD has the power to establish regulations for the disposal of all sewage within its boundaries. The Wastewater Control Ordinance, more commonly known as Ordinance 270, became effective January 1, 1973 (EBMUD, 1973). Its purpose is "to regulate the interception of sewage . . . and to provide the maximum public benefit of the sewage disposal facilities of the District" (Ord. 270, p. 1). This is achieved through: (1) source control in order to monitor and control quantity, quality, and flow of sewage, (2) monetary charges for the use of the sewage

disposal facilities, and (3) provisions for enforcement and penalties for violations (EBMUD, 1973).

EBMUD, under Ordinance 270, establishes its own limitations on discharges for specific substances (see Appendix B). The types of substances listed in the Ordinance are identical to those listed in EBMUD's permit from the RWQCB. It must be noted, however, that the concentrations of the substances listed in Ordinance 270 are different from EBMUD's SDI effluent limitations under the state permit in that the former allows more of a chemical substance to be discharged per volume. This discrepancy is due to the fact that there is considerable variation among EBMUD's dischargers. The number of dischargers (and consequently the amount of effluent) who discharge one of the chemical substances listed in the Ordinance is small compared to all possible dischargers. Non-industrial, or in this case, non-lab related dischargers, such as households or commercial business, dilute the sewage sufficiently such that EBMUD can still meet the lower concentrations required by its state permit.

#### City of Berkeley

Before UCB's effluent reaches the EBMUD system it must pass through the City of Berkeley's sewage system. The City charges UCB for transporting the sewage from the campus boundaries to the EBMUD system. Because the sewers are enclosed, the City is not concerned with what is in the sewage unless it poses a safety threat or interferes with the system's functioning. The City's Municipal Code lists substances (such as waste gas, petroleum products, and flammable substances) that are illegal to discharge. Strictly speaking, the City does no monitoring and is alerted to a possible violation of the law only if there is a problem, such as a complaint because of a smell or a line breakage (Nall, pers. comm.).

#### University of California, Berkeley

Facilities management - EBMUD's direct relation with the UCB campus is through a permit which is held by UCB's Department of Facilities Management (DOFM). Unlike the state's permit to EBMUD, the purpose of EBMUD's permit to DOFM is not to monitor water quality. Rather, it allows EBMUD to establish monetary charges for disposing of UCB's sewage. The volume of sewage is not equal to the amount of water supplied by EBMUD. Some water uses on campus are consumptive and are not returned to the sewers (for example, watering vegetation) (Black, pers. comm.). The permit allows UCB to receive a discount and be charged only for the volume of wastewater returned to EBMUD (UCB DOFM, 1982). Charges are based on both the volume of effluent and the discharger's classification. Classes are based on the discharger's primary function, for example, manufacturing industry or residential households. Dischargers in each class are expected to have characteristically similar effluent. EBMUD sets standards for filtered chemical oxygen demand and total suspended solids for each class. EBMUD has classified UCB as a "school" which, surprisingly enough, is the same category as primary and secondary schools (Damas, pers. comm.). As with all other schools, EBMUD tests UCB's effluent yearly in order to verify whether it is within the

limits for filtered chemical oxygen demand and total suspended solids. In the past, UCB has consistently met the standards for its school classification (Damas, pers. comm.). EBMUD does not, however, test annually for chemical substances listed in Ordinance 270, because as Damas states, "they have no reason to believe there is any problem" (pers. comm.). This was partially verified in May of 1982 when EBMUD tested UCB's effluent for several metals and found all to be in compliance with Ordinance 270 (see Appendix C). Because of the high cost of testing for substances such as chlorinated hydrocarbons and phenolic compounds, these are tested only if there is a "high suspicion" of their presence in significant quantities (Damas, pers. comm.).

Environmental health and safety - Another campus department concerned with chemical discharges from campus is UCB's Office of Environmental Health and Safety (EH&S). Its primary concern is safety in the lab with regards to the use and disposal of hazardous substances (radioactive, carcinogenic, toxic flammable, etc.). EH&S is not immediately concerned with UCB being a possible contributor of pollution to the Bay, even though significant quantities of chemicals going down the drain may mean that these substances are not being handled properly in the lab. EH&S has a strong impact on in-lab safety, but is not a regulatory body and merely makes recommendations. EH&S does not have a written policy that addresses chemical disposal through the drain nor has it issued recommendations on how or what chemicals should be disposed of via the drain (Gates and Boll, pers. comm.). According to John Boll, an Industrial Hygienist at EH&S, it is safe to dispose of certain chemicals (e.g., some types of alcohols) through the sewers. Boll points out, however, that if many people are observed to be pouring substances down a drain, others may interpret this procedure as being safe for disposing of potentially harmful substances, which may, in turn, cause problems indirectly. He also believes that chemical discharges pose a threat to safety in the lab. His department, however, does not respond to this potential problem.

Now that we have examined the policies addressing the issue of chemical discharges from UCB labs, we will consider effluent testing and lab surveys.